CBT 445

Head and Spine Injuries

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INTRODUCTION

The brain and spinal canal are vital and essential to normal life and they are well protected by the bony skull and the bony vertebrae. Your objective as an EMT is to identify potential brain and spinal cord injuries and do everything possible to stabilize the patient so that no further injury occurs prior to arrival at a hospital. Head and spinal injuries often go hand in hand. If you encounter a serious head injury, assume there are injuries to the spine? especially the cervical spine.

GOALS AND OBJECTIVES

Goals

- Early recognition of significant injury to brain and or spinal cord.
- Meaningful intervention including assessment of ALS indicators, routine BLS care and proper immobilization and packaging for transport.
- Safe rapid transport by appropriate means to appropriate care facility.

Objectives

Psychomotor

Given a partner, relevant equipment, and a patient with a head and/or spinal injury, the EMT will demonstrate treatment as specifically identified in the King County Emergency Medical Services BLS Patient Care Guidelines.

Cognitive - After completing this module you will be able to:

1. Identify the anatomic divisions and structures of the nervous system given a list obtaining 1 of 1 test item correct.
2. Identify layers and functions of the meninges given a list of layers and functions obtaining 1 of 1 test item correct.
3. Identify the three major types of peripheral nerves given a list of nerves obtaining 1 of 1 test item correct.
4. Identify the types of forces that can cause injuries to the spine given a list of forces obtaining 1 of 1 test item correct.
5. Identify the identify the signs and symptoms of a spine injury given a list on a multiple-choice item obtaining 1 of 1 test item correct.
6. Identify the steps for emergency care of a spinal injury given a situation and selecting the correct procedures according to KC EMS guidelines in 2 multiple-choice items obtaining both items correct.
7. Identify signs and symptoms of a head injury given a list of signs and symptoms obtaining 1 of 1 test item correct.
8. Identify the steps for emergency care of a head injury given a situation and selecting the correct procedures according to KC EMS guidelines in 2 multiple-choice items obtaining both items correct.

Standard: Given a multiple-choice exam and achieving a minimum score of 70% of the answers correct for 10 test items covering the objectives.

Head Injuries

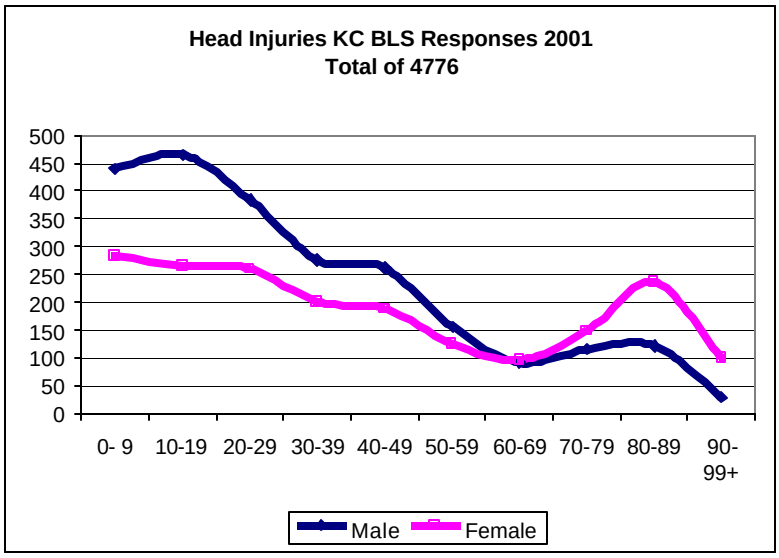


Figure 445.1
Sex and gender distribution of 4776 patients seen by BLS providers in 2001. A large number of these patients are very young.

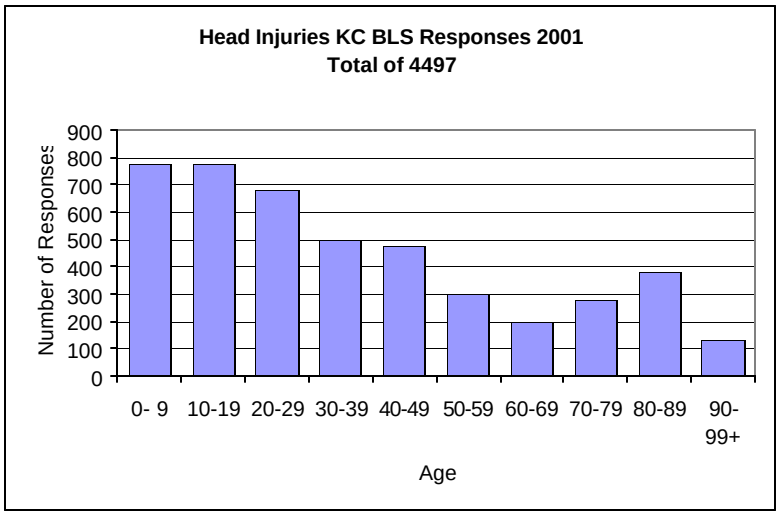


Figure 445.2
Age distribution of 4797 patients seen by EMTs in 2001 for head injury. Most patients are young, many under 20.

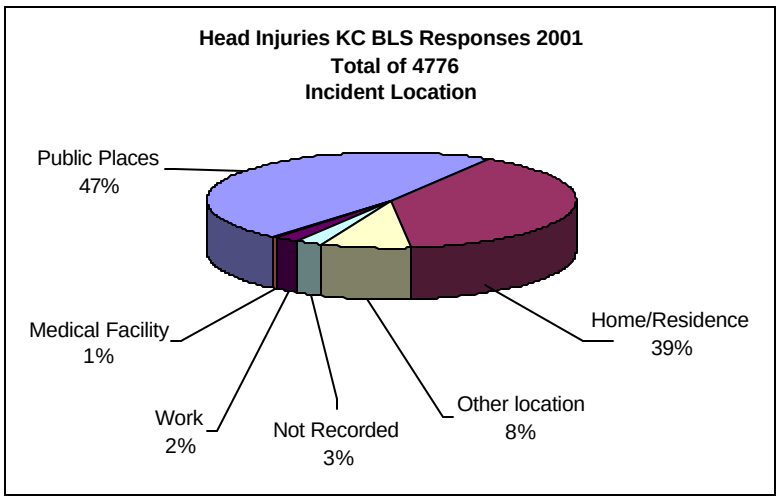


Figure 445.3
Location of 4776 patients with head injuries. Nearly ½ are seen in public places but many are also found at their place of residence.

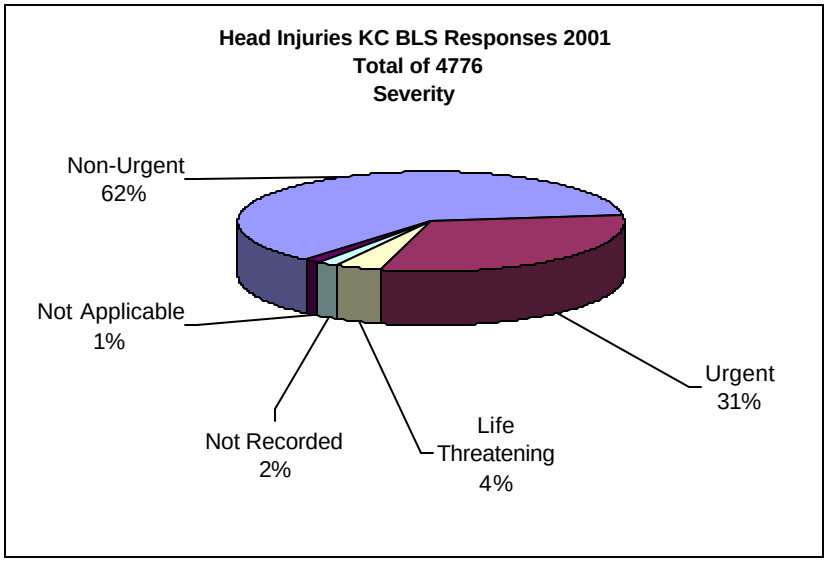


Figure 445.4
Severity of head injury as judged by EMTs who saw 4776 patients in 2001. Most were non-urgent but 4% were judged to be life threatening.

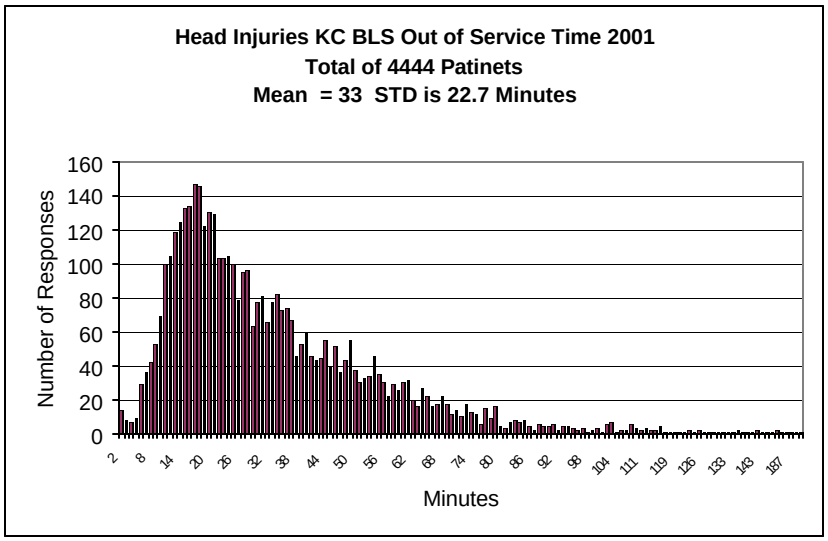


Figure 445.5
Out of service time as reported for 4444 patients with head injury. The 33-minute mean time includes time taken for extrication and transport when required. A prolonged time (> 50 minutes) should be reviewed.

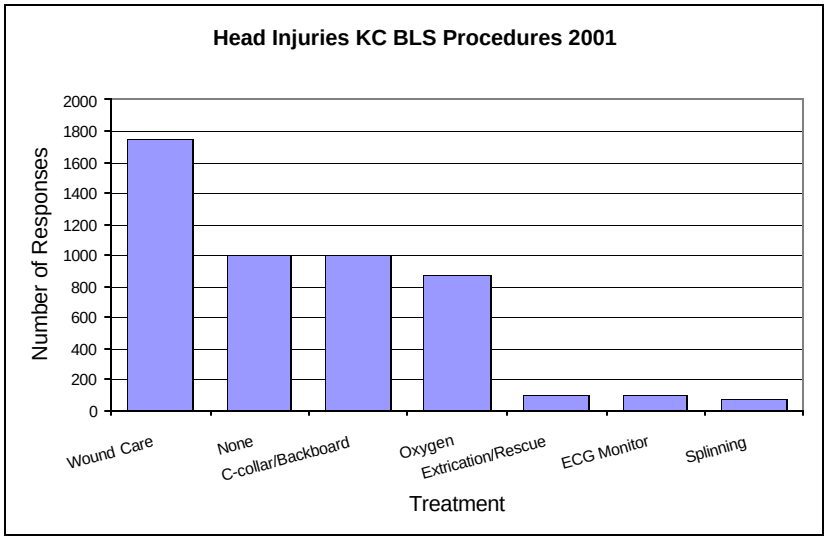


Figure 445.6
Treatments used by EMTs in 4776 patients with head injury. Many had lacerations that required wound care. Immobilization was used in about ¼.

MEDICAL TERMINOLOGY

aneurysm	A bulge in the wall of a blood vessel caused by a weakening of the wall. These are dangerous since they may burst and leak blood.
arachnoid	The middle layer of the meninges that covers the brain and spinal cord.
brain stem	Area of the brain between the spinal cord and cerebellum. The brain stem controls the basic functions that are necessary for life, such as breathing, digestion, and heart activity, and do not require conscious attention.
Battle's sign	This is ecchymosis (bruising discoloration) over the mastoid bone just behind the ear). It indicates a basilar skull fracture.
central nervous system	(CNS) The main part of the nervous system which includes the cerebrum, cerebellum, brain stem, and spinal cord. It does not include the peripheral nerves.
cerebrospinal fluid	(CSF) Clear fluid that surrounds and protects the brain and spinal cord. It provides a cushion from blows to the head.
cerebrum	Largest part of the brain. It controls thought movement, hearing, vision, speech, emotions and personality. It is what makes humans human. If the cerebrum is the size of a pin, the person is known as a pinhead.
cerebellum	A division of the brain called the "little brain." It is located below the main brain and coordinates involuntary and "primitive" functions such as balance.
clonic	Repetitive muscular activity or spasms which occur during a generalized seizure. These cease once the seizure is over.
dura mater	The outer portion of the meninges. The dura mater is fairly strong. Think of it as a thin rubber-like layer that covers the brain and spinal canal.
ecchymosis	Bruising caused by bleeding under the skin. Another term for ecchymosis around the eye is a "black eye."
embolus	A substance (usually a blood clot) that travels through arteries or veins where it can cause blockage of a vessel.
foramen magnum	This is the hole at the base of the skull through which the spinal cord exits

hematoma	The collection of blood caused by a break in a blood vessel.
meninges	A covering over the brain and spinal cord that protects the delicate structures. The meninges are located just beneath the skull and inside the spinal canal.
neutral position	A position where the patient's spine is at no stress. In other words, it is not flexed, extended, or rotated.
peripheral nervous system	The peripheral nervous system included the nerves from the spinal cord to the body's organs, skin, and muscles. It includes sensory and motor nerves coming from the spinal cord and brain stem.
pia mater	Inner layer of the meninges. The pia mater is a very fine membrane lying directly on the surface of the brain and spinal cord.
raccoon eyes	Bruising under the eyes which resembles the appearance of a raccoon. It often indicates skull fracture. The medical term is *periorbital ecchymosis*.
thrombus	A blood clot that forms in a vessel.
tonic	Rigid muscle contractions that occur with generalized seizures. They stop when the seizure is over.

Central Nervous System

The nervous system consists of the central nervous system and the peripheral nervous system. The central nervous system includes the cerebrum, cerebellum, brain stem, and spinal cord.

Peripheral Nervous System

The peripheral nervous system consists of the nerves traveling from the spinal cord and brain stem to all parts of the body. Nerves from the brain stem are called cranial nerves (because they originate in the cranium or head). There are 12 cranial nerves that control eye movement, facial muscles, taste, and hearing.

Nerves that extend from the spinal cord that control the muscles of the body are called motor nerves since they cause muscles to move. Sensory nerves allow sensations of feeling, hot or cold, and position that travel back to the spinal cord and up to the brain. These carry sensory signals to the central nervous system.

Somatic Nervous System

The peripheral nervous system is complex and is divided into two parts: somatic and autonomic. The somatic nervous system is made of motor nerves that extend to the muscles and sensory nerves that return from the muscles and skin back to the spinal cord.

Here's an example of how the somatic nervous system works.

Say you are reaching for a potato. Your brain thinks "potato" and sends a signal to the spinal cord. The signal then travels through the motor nerve to the muscles. The muscles execute and you grab the potato. Now, let's say the potato is very hot. The sensory cells in your skin connected to the nerve send a signal back to the spinal cord that "tells" you to drop the potato.

Autonomic Nervous System

The autonomic nervous system is just like the word implies – it is automatic and you don't have to think about it. Breathing is largely controlled by the autonomic system. Just imagine if you had to consciously think of every breath you took – "breathe in, breathe out." There would be little time left for life's more enjoyable activities like washing windows and doing dishes. The autonomic nervous system also controls heartbeat, digestion, sweating, and some emotions like anxiety.

The autonomic nervous system has two divisions:

- sympathetic
- parasympathetic

The **sympathetic nervous system** prepares your body to take action under stressful or dangerous conditions, for example, fright, trauma or blood loss. It prepares your body for "fight or flight" and causes the following responses:

- increased heart rate
- constriction of peripheral blood vessels
- bronchodilation
- sweating
- increased energy production
- relaxation of bladder muscles

The **parasympathetic nervous system** allows your body to carry out activities under generally relaxed conditions such as sleep, digestion and sex. It is sometimes called the "feed-or-breed" system. Some of the effects of this system include increased digestive activity, decreased heart rate and bronchoconstriction.

The two divisions of the autonomic nervous system are often in balance, but in stressful situations, the sympathetic system will dominate. The reverse is true in times of relaxation.

A patient's presentation may be influenced when either of these two systems is activated by trauma or other causes. An activated parasympathetic nervous system may cause:

- hypotension
- bradycardia
- defecation
- drooling
- warm skin temperature

An activated sympathetic nervous system may cause:

- tachycardia
- dilated pupils
- pale, sweaty skin
- increased resp. rate
- increased BP

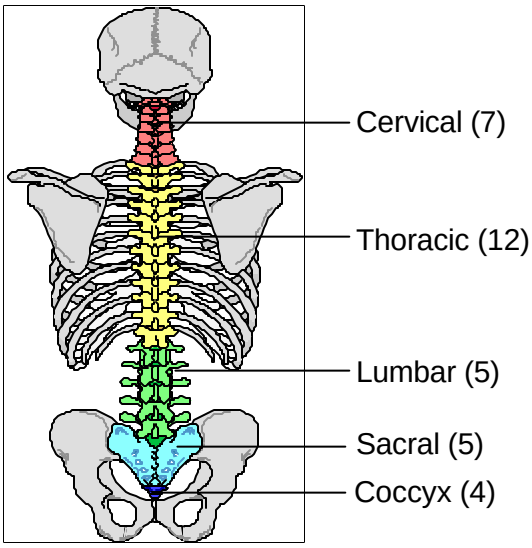
Skull

The skull is fortunately a very hard bone. Otherwise we would have to wear helmets all the time. Nevertheless, if a force is strong enough, the skull can be cracked, just like a coconut shell.

Spinal Column

The spinal column keeps us upright and prevents us from turning into blobs of skin and bones. There are 33 vertebrae in the spinal column.

- 7 cervical vertebrae
- 12 thoracic vertebrae
- 5 lumbar vertebrae
- 5 sacral vertebrae*
- 4 coccyx vertebrae**



* The sacrum looks like one bone because the 5 vertebrae are fused.

**The coccyx are 4 small vertebrae often fused together.

The bones in the spinal column are stabilized by muscles and ligaments that allow the spine to bend and twist to some degree. The only part of the spinal column that is not protected by muscles and ligaments is the spinous process--the bony parts sticking out along the back. The spinal cord travels down the center of the vertebrae in the spinal canal. If the central part of the spinal canal is sufficiently disrupted, bent, or broken, the spinal cord will be damaged. The location and degree of damage will determine the location and degree of paralysis.

Meninges

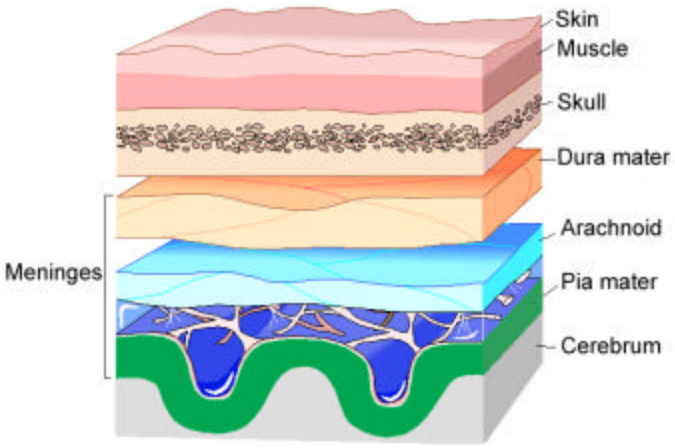
The central nervous system is protected by several membranes called the meninges. The meninges surrounds both the brain and spinal cord and contains three distinct layers:

- dura mater
- arachnoid
- pia mater

The **dura mater** is the outermost layer of the meninges. This thin, rubber-like layer is attached to the inner surfaces of the cranium and spinal column.

The middle layer is called the **arachnoid**.

The **pia mater** covers the surface of the brain and spinal cord. The space between the pia mater and the arachnoid is filled with cerebrospinal fluid.



Layers of the meninges

Cerebrospinal Fluid

Cerebrospinal fluid (CSF) cushions the brain in the event of trauma. It surrounds the brain and acts like a shock absorber. The fluid circulates around the outside of the brain and spinal cord. There are also chambers within the brain (known as ventricles) that produce the fluid. The fluid is kept within the layers of the meninges so that it doesn't leak away.

When the brain is injured (for example, from a blow to the head) it can swell in size. Since the skull is a closed space there is no room for expansion. This increases pressure on the brain. BLS providers can assess probable increased pressure by noting changes in physical signs, vital signs, behavior and respiratory rate.

If the pressure inside the skull becomes great enough, it can push against the exit hole at the base of the skull (foramen magnum) leading to involuntary posturing (called decorticate or decerebrate posturing). It can also cause changes in pupil size and respiratory rate and pattern. Seeing a dilated pupil following head trauma is a very poor sign and suggests that brain is under great pressure and trying to squeeze out the exit hole.

Scalp Lacerations

Scalp lacerations are messy because they bleed so profusely. Since 25% of the heart's output goes to the head, a lot of blood circulates through the scalp. The best way to manage a scalp laceration is to apply direct pressure, even when bleeding is arterial and spurting.

Skull Fractures

It is possible to detect a skull fracture through light palpation. However, soft tissue swelling can make detection more difficult. Cover open skull fractures with sterile dressings. Do not attempt to push brain contents back into the skull.

Head trauma alone (unless fatal) rarely causes significant shock. If a trauma patient is in shock, look for other sources of bleeding or injury.

Concussion

Concussions usually are caused by blows to the head and face. When a boxer is knocked out by a punch, he is actually having a concussion. A concussion involves a temporary loss of consciousness with return of full brain activity. There is no permanent damage though there may be symptoms of dizziness or headache for several days following the trauma. A patient often experiences loss of memory of the events that happen immediately before the concussion. This is called retrograde amnesia.

Contusion

Unlike a concussion which leaves no permanent injury, a contusion is a bruise to the brain and can lead to permanent damage. Hospital staff can detect a contusion by a CT or MRI scan of the brain. It is often impossible for the field provider to distinguish between a concussion and a contusion.

Intracranial Bleeding

Bleeding from a ruptured or cut blood vessel leads to intracranial bleeding or bleeding within the head. Depending on the location, the bleeding can be within the brain (an **intracerebral** hematoma), outside the brain but beneath the dural covering (a **subdural** hematoma) or on top of the dura but beneath the skull (an **epidural** hematoma). Subdural hematomas are the most commonly encountered types of intracranial bleeding.

If the bleeding is substantial and occurs rapidly enough it can cause much damage and lead to rapid worsening of the patient's condition. The damage is primarily caused by an increased pressure. The skull is a closed structure and if bleeding occurs it pushes the brain contents and causes pressure in the skull to rise. Whenever a patient starts deteriorating following a closed head injury, you should suspect brain swelling (perhaps secondary to intracranial bleeding).

Assessing Head Injuries

When you come upon a patient with a closed head injury the most important things you can do are to carefully assess level of consciousness and determine if there are neurological deficits.

- Is the patient thinking and speaking clearly?
- Does the patient understand you completely?
- Can the patient move all his limbs?
- Does the patient have normal sensations when you touch the skin?

And most important: Is the patient's neurological status stable or deteriorating?

You must frequently assess (once every five minutes) the neurological status of the head-injured patient.

A common complication of a head injury is **cerebral edema** or swelling of the brain. Early signs of cerebral edema are difficult to detect. An early sign of cerebral edema is unconsciousness. Late signs of cerebral edema are very serious and include:

- changes in respiratory patterns
- unequal pupils
- posturing (decorticate or decerebrate)

Adequate ventilation and high flow oxygen are beneficial to the head-injured patient. When you see late signs of cerebral edema, increase the ventilation rate with a bag-valve mask unit to **20 breaths per minute** (once every 3 seconds).

It is sometimes difficult to distinguish signs of shock from signs of increasing intracranial pressure.

A patient with an isolated head injury should not exhibit signs of hypovolemic shock. In general, shock due to blood loss results in a fast pulse and, if severe enough, a falling blood pressure. If a head-injured patient shows signs of hypovolemic shock, you need to suspect other internal injuries. Increasing intracranial pressure in general results in a slow pulse and, if severe enough, a rising blood pressure.

	Hypovolemic Shock	Increased Intracranial Pressure
Pulse	fast pulse	slow pulse
BP	falling BP*	rising BP*

* If shock is severe

INJURIES TO THE SPINE

Assessing Spine Injuries

Forces on the Spine
The cervical, thoracic, and lumbar portions of the spine can be injured in a variety of ways. Compression injuries can occur as a result of a fall regardless of whether the patient lands on his feet, head or coccyx. Motor vehicle crashes or other types of trauma can overextend, flex, or rotate the spine.

Any one of these unnatural motions, as well as excessive lateral bending, can result in fractures or neurologic deficit. Any time the spine is distracted, or pulled along its length, you can expect to find serious injuries. For example, hangings typically fracture the vertebrae high in the cervical spine.

Assessment
The spine can be palpated for deformities, tenderness and open injuries. Palpate down the spinous processes starting in the neck and working down. The patient should be moved as little as possible. Most spinal injuries are a result of motor vehicle accidents, falls, or direct trauma to the spine.

SPINAL IMMOBILIZATION CONSIDERATIONS

EMTs and paramedics have always made decisions concerning whether or not to apply spinal immobilization. The following criteria are guidelines to help you with that decision.

Immobilization may be unnecessary if **ALL** of the following apply:

- No significant mechanism of injury
- No back or neck pain with or without movement
- No pain or tenderness of back or neck on exam
- No altered level of consciousness (patient must be alert & oriented X 3)
- No history of loss of consciousness
- No recent alcohol or drug use
- Patient must be a reliable historian: no language barrier, psychosis, or other mental disability

Immobilization is definitely necessary in these situations:

- Significant mechanism of injury (MOI) most important
- Complaint of pain of neck or back with or without movement
- Altered level of consciousness
- History of loss of consciousness
- Unreliable historian
- Intoxication with alcohol and/or drugs

- Very young or elderly
- Significant injury above femurs
- Significant acceleration/deceleration injury
- Diving accidents
- Falls greater than 10 feet
- GSW to neck, chest, abdomen, pelvis, or groin
- Stabbing in close proximity to spine
- Any significant head injury
- Drowning victim of unknown cause
- Electrocution and explosion victims
- Complaint of paralysis, numbness, weakness, tingling, or burning sensation of the arms or legs after a traumatic injury

Once you have initiated immobilization, it should be continued until the patient is delivered to the next level of care. EMS personnel should not “clear” patients with suspected head, neck, or spine injuries or remove immobilization devices after they have been applied.

A SYSTEMATIC APPROACH TO PATIENT CARE

(S) SUBJECTIVE (History)

- Significant mechanism of injury
- Transient loss of consciousness
- Amnesia or repetition of questions after blow to head
- Diving accident
- Drowning with unknown cause
- Falling from height greater than 10 feet
- Electrocution
- Numbness, tingling, “pins and needles” sensations
- Burning pain
- Paresthesia, paralysis
- Seizures

(O) OBJECTIVE (Physical Exam)

- Abnormal vital signs, elevated BP
- Altered level of consciousness
- Irrational or combative behavior
- Abnormal respiratory pattern
- Glasgow Coma Scale determination
- Posturing (abnormal flexion or extension of extremities)
- Lacerations, ecchymosis of eyes
- Pain along the spine with or without movement
- Tenderness along the spine
- Loss or impairment of sensation
- Vomiting
- Weakness in the extremities
- Paralysis
- Significant injury above the femur
- Gunshot wound to the neck, chest, abdomen, pelvis or groin

Glasgow Coma Scale (GCS)

The Glasgow Coma Scale (GCS) is an objective measure of neurologic function that is used in patients with head trauma. GCS score ranges from 3-15 based on three responses: eye opening, verbal response, and motor response.

Infant	Child/Adult
Eye Opening **4** Spontaneous **3** To speech/sound **2** To pain 1 No response	***Eye Opening*** **4** Spontaneous **3** To command **2** To pain **1** No response
Verbal Response **5** Coos or babbles **4** Irritable cries **3** Cries to pain **2** Moans, grunts to pain **1** No response	***Verbal Response*** **5** Oriented **4** Confused **3** Inappropriate words **2** Incomprehensible **1** No response
Motor Response **6** Spontaneous **5** localizes pain **4** Withdraws from pain **3** Abnormal flexion **2** Abnormal extension **1** No response	***Motor Response*** **6** Obeys commands **5** Localizes pain **4** Withdraws from pain **3** Abnormal flexion **2** Abnormal extension **1** No response

(A) ASSESSMENT (Impression)

- A summary of the EMT's impression about the patient's condition.
- Severity of the condition.
- Identification of ALS and BLS criteria.

ALS Indicators	BLS Indicators
• Major mechanism of injury • Any abnormality in GCS (eg. score < 15) • Compromised airway • Abnormal respiratory patterns • Paresis and/or parenthesis • Unstable vital signs • Hypotension / signs of shock • Evidence of injury to brain or spinal cord • Significant alcohol or drug use	• Minor mechanism of injury • Intact airway • Stable vital signs • Normal blood pressure • No evidence of injury to brain or spinal cord • No significant drugs or alcohol

(P) PLAN (Treatment)

BLS CARE

- Request medics if indicated
- Ensure open airway (use jaw thrust – protect the cervical spine)
- Provide supplemental oxygen at high flow
- Assist ventilation as necessary
- Provide in-line stabilization, with proper sizing and padding
- Secure to backboard
- Trendelenburg position if hypotensive
- Bandage as necessary
- Monitor vital signs and neurologic status

Special Instructions For Suspected Cervical Spine Injury

Align neck to a neutral, in-line position unless new pain, new numbness, tingling or weakness, new compromise of airway or ventilation or resistance encounter. Apply cervical collar and backboard. If unable to realign then secure in the original position.

Special Instructions For Helmet Removal

Football Helmets. Leave helmet in place if it stabilizes head and does not impair breathing or airway. If helmet needs to be removed, two EMTs should open face guard, stabilize neck and head, remove chinstrap, remove helmet while stabilizing head, and apply cervical collar and backboard.

Motorcycle & Bicycle Helmets. Helmets are always removed. Two EMTs should open face guard, stabilize neck and head, remove chinstrap, remove helmet while stabilizing head, and apply cervical collar and backboard.

TRANSPORT DECISIONS

Standard criteria for:

Leave At Scene

Except: Most patients with head and neck injury will require transport

PRIVATELY OWNED VEHICLE (POV)

Except: Transport must maintain splinting and other BLS measures

BLS Aid Car/Private Ambulance

Except: Patient requires backboard and cervical immobilization for transport

ALS

DESTINATION DECISIONS

Standard criteria for:

Self-Care

Except: Most head and neck injuries will not respond to self-care

Clinic Or Doctor's Office

Except: Patients on backboard may be refused by clinics

Except: Patients with hard tissue injury will require an x-ray for diagnosis

Hospital Emergency Room

Except: Consider specific facilities for specific conditions (e.g. Level I Trauma, Level III/IV Trauma, Pediatric Center)

SHORT RADIO REPORT

The radio report should be short, concise and include the following information:

- Unit/agency
- Number of patients
- Patient's level of consciousness, age and gender
- Patient's chief complaint (MOI and/or NOI)
- Patient's vital signs and symptoms
- Treatment provided

Example:

- Medic 10 Aid 15
- High-speed motor vehicle accident
- Unconscious 40-year old male with head and spinal injury
- Rapid, shallow respirations, weak pulse, BP 80 systolic (palp), skin pale and diaphoretic
- Patient extricated and immobilized with c-collar & backboard
- Assisting with bag-valve-mask ventilations

CASE STUDIES

CASE 1

Subjective

At 2030 hours you are called to a scene where you see a 74 y/o female c/o head and back pain. You find the patient lying in parking lot next to her car. She is conscious and slightly confused. She states two men came up behind her and that one hit her in the back of the head, pushed her to the ground and stole her purse. She says she was unconscious for a few seconds and when she awoke she tried to sit up but feels dizzy, lightheaded and has fuzzy and unclear vision. Patient begins to projectile vomiting. Quit smoking in 1972. Medications included aspirin, Simvastatin, Doxazosin. No allergies

Objective

Found patient supine on parking lot next to car. Large bump on back of head, conscious, oriented and slightly confused.	
Vitals:	B/P: 160/80, bilateral RR: 16 HR: 80 Skin: warm, dry
HEENT:	Pearl, no JVD, carotids, trachea is midline
Chest:	Lungs are clear and equal with good exchange, pain made worse by deep inspiration, tenderness over the 5th lateral rib on the left auxiliary line.
Abdomen:	Soft, no masses
Extremities:	Good radial pulses, no edema noted, good motor/sensory all ext.

Assessment

The likely cause for this case of pain is:

A. Chest wall
B. Contusion to head back and ribs
C. Head ache
D. Fractured ribs
E. Contusion Pleural cavity

Does this patient have ALS indicators?

Does this patient have BLS indicators?

Plan

Which BLS treatment measures would be appropriate for him?

1. Oxygen therapy
2. C-collar
3. Keep airway clear
4. Immobilization on backboard
5. Monitor vitals
6. Transport to local hospital
7. BLS transport

CASE 2

Subjective

At 1530 you are called to see a 26 y/o male STB unconscious lying on sidewalk. Patient is a known drug user and smells of alcohol. There is a large laceration to the top of the patients head. Meds and allergies are unknown.

Objective

Patient is in supine position on sidewalk, unconscious, withdraws from painful stimuli	
Vitals:	B/P: 100/80 RR: 12 HR: 56, weak Skin: cool, dry, pink skin
HEENT:	Pupils constricted and unresponsive
Chest:	clear and equal bilaterally
Abdomen:	soft, non-tender, no masses
Extremities:	slow motor/sensory, large laceration on head

Assessment

The likely cause for this case is…

A. Drugs
B. Head injury
C. Alcohol
D. Abdomen
E. Non-organic in origin
F. Drugs, alcohol, head injury

Does this patient have ALS indicators?

Does this patient have BLS indicators?

Plan

Which BLS treatment measures would be appropriate for him?

1. Oxygen therapy
2. C-collar
3. Treat head injury
4. Airway management
5. Immobilization on backboard
6. Request paramedics
7. Approve POV transport to local urgent care clinic
8. BLS transport

CASE 3

Subjective

14 y/o male involved in auto vs.bicycle. Bystanders state that car was backing out of drive-way when the bicycle impacted the side of the car. The unhelmeted rider was unconscious upon arrival of the EMTs, regaining consciousness during their primary exam. STHB unconscious less then 5 minutes. Meds and allergies unknown.

Objective

Patient is laying on sidewalk, unconscious, then regains consciousness	
Vitals:	B/P: 90/60 RR: 18 HR: 100 Skin: Warm, flushed
HEENT:	Pupils slightly dilated & reactive to light
Chest:	Clear and equal bilateral
Abdomen:	Rigid, tender
Extremities:	No deficits noted, abrasion on arms and legs

Assessment

The likely cause for this case is…

A. Chest wall, muscle strain
B. Leg and arm abrasions
C. Head injury, internal injuries
D. Abdomen rigid
E. Vomiting
F. Neck and head pain

Does this patient have ALS indicators?

Does this patient have BLS indicators?

Plan

Which BLS treatment measures would be appropriate for him?

1. Oxygen therapy
2. C-collar
3. Airway management
4. Treat for shock
5. Immobilization on backboard
6. Request paramedics
7. Prioritize treatment
8. BLS transport

CASE 4

Subjective

34 y/o male on a motorcycle sideswiped by truck on freeway. Bystander's state that the motorcyclist rolled about ten times before he came to a stop on the side of the road. No reported loss of consciousness. No medications or allergies.

Objective

Patient conscious, oriented x 3, can't move legs.	
Vitals:	B/P: 110/50 RR: 12 HR: 60 Skin: warm, pink, dry
HEENT:	Pupils MER
Chest:	Clear and equal bilat, no pain to palp
Abdomen:	Soft, non-tender, and no masses
Extremities:	Tenderness & deformity to pelvis, small abrasions on arms and legs but mostly protected by heavy leathers, right shoulder deformity

Assessment

The likely cause for this case is…

A. Chest wall
B. Head injury
C. Abdomen
D. Fractured pelvis, back, and neck, shoulder
E. Hip fracture, shoulder fracture

Does this patient have ALS indicators?

Does this patient have BLS indicators?

Plan

Which BLS treatment measures would be appropriate for him?

1. Oxygen therapy
2. C-collar
3. Airway management
4. Helmet removal
5. Immobilization on backboard
6. Request paramedics
7. Transport to Harbor view
8. BLS transport

CASE 5

Subjective

At 0300 you are called to see a 38-year-old male who was involved in a high speed head on accident.

Objective

Patient found unrestrained in drivers seat c/o pain to chest and legs, anxious, A&Ox3	
Vitals:	B/P: 106/60 RR: 24 HR: 120 Skin: Warm, moist; pale in color
HEENT:	Pupils dilated & equal with slow reaction to light
Chest:	Clear and equal bilat, pain to palp front of chest
Abdomen:	Soft, non-tender, and no masses
Extremities:	Deformity to both lower legs, contusion to chest

Assessment

The likely cause for this case of chest pain is…

A. Chest wall
B. Contusion to sternum
C. Airway
D. Abdomen
E. Fracture to both lower legs
F. Fracture to both tibfibs and possible fractured ribs

Does this patient have ALS indicators?

Does this patient have BLS indicators?

Plan

Which BLS treatment measures would be appropriate for him?

1. Oxygen therapy
2. C-collar
3. Airway management
4. Splinting lower legs
5. Immobilization on backboard
6. Request paramedics
7. Approve POV transport to local urgent care clinic
8. BLS transport

RESOURCES AND REFERENCES

King County Emergency Medical Services Patient Care Guidelines for Basic Life Support

AAOS Emergency Care and Transportation of the Sick and Injured, 7th Edition.

Web Sites:

Centre for Neuro Skills
www.neuroskills.com/index.html

Anatomy of Nervous System
www.besthealth.com/bguide/reftext/html/nerv_sys_fin.html

Spinalcord Injury Information Network
www.spinalcord.uab.edu/

Paralinks
www.paralinks.net/parainfo.html

Spinal Cord Injury Resource Center
www.spinalinjury.net/

Neurotrauma Law Nexus
www.neurolaw.com

Neurotrauma Law Nexus – Resource for understanding the legal system's involvement in brain and spinal cord injury cases.

KING COUNTY EMERGENCY MEDICAL SERVICES

RECERTIFICATION

SKILLS CHECKLIST

CBT 2003 HEAD & SPINAL INJURIES

EMTNAME & #	PLEASE PRINT YOUR NAME	**DATE**	

Goal: Early recognition, meaningful treatment, and safe rapid transport to the appropriate facility.

Objective: Given a partner, relevant equipment and a patient with a head and /or spinal injury demonstrate treatment as specifically identified in the BLS Patient Care Guidelines.

SCENE SIZE-UP

• Scene Safety	• Body Substance Isolation	• Additional Resources

INITIAL ASSESSMENT

• Level of Consciousness	• Airway	• Breathing	• Circulation and C-Spine Precaution	• Bleeding

SUBJECTIVE (FOCUSED HISTORY)

- Found out about Mechanism of Injury
- Found out about patient's complaint from neurologic injury
- Reassured and tried to calm patient

OBJECTIVE (FOCUSED PHYSICAL EXAM)

- Recorded and documented baseline vital signs
- Used Glasgow Coma Scale
- Exposed and examined injury for location
- Followed up with second set of vital signs
- Evaluated for peripheral effects of injury
- Evaluate for additional injuries

ASSESSMENT (IMPRESSION)

- Stated type of head and/or spinal injury
- State opinion of type of head or spinal injury
- State ALS indicators and/or BLS indicators
- Determined treatment plan based on head and/or spinal injury
- Considered severity and need for ALS intervention (intubation, IV's or medication)

PLAN (TREATMENT)

- Request medics if indicated
- Insure open airway
- Use high flow oxygen
- Ventilate as needed
- Apply C-collar and immobilize on backboard
- Maintain body temperature

COMMUNICATION

- Delivered short radio report within 60 seconds

DOCUMENTATION

- Completed **SOAP** narrative portion of Medical Incident Report Form

RECERTIFY	**YES?**	**NO?**	**EVALUATOR**	PLEASE PRINT YOUR NAME AND SIGN